CLAIMS

What is Claimed is:

1. An energy storage device for delivering pulsed power to a load comprising:

a toroid overwrapped by a plurality of turns of first wire;

at least two switches magnetically coupled to said first wire and dividing said first wire into a plurality of first wire segments;

a plurality of first current blocking devices each having a first positive end, and a first negative end, each of said first positive ends coupled to said first wire segment at a location adjacent to said switches and each of said first negative ends connected to said load; and

a plurality of second current blocking devices each having a second positive end and a second negative end each of said second positive ends connected to said load and each of said second negative ends connected to said first wire segment.

2. The energy storage device of claim 1 wherein said plurality of turns of said first wire between said opening switches are equal.

3. The energy storage device of claim 2 wherein said plurality of turns of first wire on said toroid is between 100 and 500 turns.

4. The energy storage device of claim 3 wherein said first wire is copper.

5. The energy storage device of claim 4 wherein cooling fluid is passed through the center of said first wire.

6. The energy storage device of claim 3 wherein the outer radius of said toroid is about 1.0 meter and the inner radius is about 0.5 meters.

7. The energy storage device of claim 1 wherein said current blocking devices are selected from the group consisting of diodes and spark gaps.

8. The energy storage device of claim 1 wherein said switches comprise a plurality of turns of wire wrapped around a core of ferromagnetic material encircling said first wire.

9. A method for producing pulsed power comprising:

closing at least two switches, said switches magnetically coupled to a first wire wrapped a plurality of turns around a toroid and said switches dividing said first wire into a plurality of first wire segments;

passing electrical current through said first wire thereby causing energy to be stored in a resultant magnetic field; and

actuating simultaneously said switches to increase the impedance of the portions of said first wire segments adjacent to said switches causing a pulse of said stored energy to flow from each of said portions of said first wire segments.

10. The method of claim 9 wherein said pulse of energy flows through an energy blocking device to a load.

11. The method of claim 10 wherein said current blocking devices are selected from the group consisting of diodes and spark gaps.

12. The method of claim 11 wherein said at least two switches each comprise a plurality of turns of a second wire wrapped around a core of ferromagnetic material encircling said first wire and said actuation comprises applying an electrical trigger pulse to each second wire.

13. A method for producing power comprising:

providing an inductor;

charging said inductor with a current to store energy in a magnetic field of the inductor; and

opening a plurality of switches so as to electrically isolate a plurality of segments of the inductor and electrically discharge such segments in parallel.

14. The method of claim 14 wherein the inductor comprises a core and at least one conductor wrapped a plurality of turns around the core and wherein said plurality of switches each themselves comprise a switch inductor encircling the at least one conductor and wherein said opening comprises applying at least one electrical pulse to said switch inductors.

15. The method of claim 14 wherein said at least one electrical pulse is a single pulse applied to said switch inductors in common.

16. An energy storage device for delivering power to a load comprising:

a first conductor wrapped a plurality of turns and forming a plurality of inductor elements;

plurality of switches each comprising:

a ferromagnetic core encircling the first conductor; and

a second conductor wrapped a plurality of turns around the ferromagnetic core;

a plurality of first leads, each on a first side of an associated one of the switches for coupling to a first pole of the load; and

a plurality of second leads, each on a second side of an associated one of the switches for coupling to a second pole of the load.

17. The device of claim 16 wherein:

there are at least three such switches and associated such first and second leads.

18. The device of claim 16 wherein:

there are 4-50 such switches and associated such first and second leads.

19. The device of claim 16 further comprising at least one core element around which said first conductor is wrapped said plurality of turns.

20. The device of claim 16 further comprising a single core element around which said first conductor is wrapped said plurality of turns.

21. The device of claim 16 wherein energy stored in the device is stored principally inductively.

22. A method for operating an opening switch device for increasing the impedance of a portion of a first conductor comprising:

providing a ferromagnetic core encircling the conductor overwrapped by a plurality of turns of a second conductor;

directing a charging current through the first conductor effective to at least partially saturate the ferromagnetic core; and

directing a trigger current through the second conductor effective to drive the ferromagnetic core out of said at least partial saturation and thereby increase the impedance of a section of the first conductor encircled by the ferromagnetic core by a factor of at least ten.